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Directory of
IRON, STEEL
and
NONFERROUS ALLOYS

Used in Design of Machines

Third Edition

*Published as a
Supplement to*



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THIS third edition of MACHINE DESIGN'S Alloy Supplement is a complete revision of earlier editions. It has been brought up-to-date through the co-operation of producers of alloys, for the assistance of machine designers in the selection of materials for their use.

TO MAKE the directory more valuable for reference purposes, alloys have been classified by properties. Numbers signifying these properties appear immediately above each listing and the key is printed at the foot of all pages; other less common properties are given in the text matter. The alloys also are listed alphabetically by trade name.

ADDITIONS to the list will be announced periodically in MACHINE DESIGN. It is suggested that information on these new materials be added to their respective alphabetical groups, using the blank spaces provided in the directory for this purpose.

Twenty-Five Cents

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9-19-33

Directory of Alloys

Used in Design of Machines

A

1 - - - - -
ACME; "18" stainless; carbon under .12, manganese under .50, silicon under .50 chromium 11.5 to 14, phosphorus .025 max., sulphur .025 max. "RA" stainless; carbon .10 max., manganese .40, chromium 16, silicon 1, copper 1, phosphorus and sulphur .03. "18-8" stainless; carbon under .16, manganese under .50, silicon .50, chromium 17 to 20, nickel 7 to 10, phosphorus .025 max., sulphur .025 max. Acme Steel Co., Chicago.

1 - - - - -
ADMIRALTY BRONZE; copper 70, tin 1, zinc 29, standard alloy for condenser tubes, particularly for salt or brackish water. Chase Brass & Copper Co. Inc., Waterbury, Conn. Conn.

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ADNIC, corrosion resistance is major property, others include high malleability; copper 70, tin 1, and nickel 29 per cent; sheet, wire and rod. Scovill Mfg. Co., Waterbury, Conn.

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ADVANCE; for electrical use primarily, nonmagnetic; copper 54, nickel 46; thermocouple material for applications where low temperature coefficient of resistivity is required; measuring instruments, precision equipment, industrial and radio rheostats, and elevator controls. Driver-Harris Co., Harrison, N. J.

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AGATHON; general brand name for alloy steel for resistance to wear, shock, stress and strain. Republic Steel Corp., Youngstown, O.

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ALCOA; light weight aluminum alloys for sand, die and permanent mold castings, plate, sheet, foil, bar, rod, wire, tubing, structural shapes, moldings, forgings and stampings; numerous grades with varying compositions to meet such specific requirements as corrosion resistance, good electrical and thermal conductivities, high strength-weight ratio, etc. Aluminum Co. of America, Pittsburgh.

1 - - - - - 7 - -
ALCUMITE; copper 90, aluminum 9, iron 1; for pumps, valves, pipe, fittings, bars and castings for corrosive service where a copper base alloy is preferred. Duriron Co. Inc., Dayton, O.

1 2 - 4 5 - - -
ALCUNIC; corrosion resistance is major property; copper 70, nickel 1, aluminum 2 and zinc 27 per cent; condenser tubing, wire, rod, sheet. Scovill Mfg. Co., Waterbury, Conn.

1 2 - - 5 - - 8 - 10
ALLEGHENY METAL; resists corrosion; carbon .05 to 1, manganese .50 max., phosphorus .025 max., sulphur .025 max., silicon .50 max., chromium 16 to 20, nickel 7 to 10; used for dairy equipment, pulp and paper

machinery, domestic machines, laundry machine parts, etc. Allegheny—33; corrosion resisting chromium steel alloy; carbon under .12, manganese under .50, phosphorus under .025, sulphur under .025, silicon under .50, chromium 12 to 15; resists temperatures up to 1500 degrees Fahr. Grade 44; readily fabricated and resists high temperatures; carbon under .20, manganese under 1.25, sulphur under .025, phosphorus under .025, silicon under .50, chromium 20 to 30, nickel 10 to 20; malleable and ductile and is machined easily; for pump parts, etc. Grade 46; low-alloy, heat and corrosion resisting steel; carbon .12 to .20, manganese .50 max., phosphorus .04 max., sulphur .04 max., silicon .50 max., chromium 4 to 6, molybdenum .4 to .6, tungsten 1 to 1.25, aluminum .5 to 1, copper .5 to 1; for dampers, pumps, valves, etc. Grade 55; chromium iron alloy for high temperature service up to 2150 degrees Fahr.; carbon under .25, manganese under 1, sulphur under .025, phosphorus under .025 silicon under .50, chromium 26 to 30; machinable in softened condition, for furnace parts, etc. Grade 66; chemical resisting chromium steel; carbon .12, manganese .31, silicon .216, chromium 17.66, nickel .24; analysis for upper chromium limit; for nitric acid, steam engine parts, etc. Allegheny Steel Co., Brackenridge, Pa.

1 2 - 4 5 - - - -

AMBRAC; grade A; copper 75, zinc 5, nickel 20. B, copper 65, zinc 5, nickel 30. B has better corrosion resisting properties than A because of the higher nickel content. Grade A is for tubes for condensers and heat exchangers, etc. American Brass Co., Waterbury, Conn.

1 2 3 4 5 - - 8 - -

AMERICAN; stainless steel, chromium 8 to 60, carbon over .12, balance mostly iron; for oil, textile, pumping machinery, and other equipment requiring a corrosion resistant (primary property), tough, hard, high strength heat treated alloy. Stainless iron, chromium 8 to 60 per cent, carbon .12

per cent or under, balance mostly iron; for oil, dairy, laundry, textile, paper, refrigerating equipment etc. where a corrosion resistant, ductile, heat and abrasion resistant alloy is required. American Stainless Steel Co., Pittsburgh.

1 - - 4 5 6 - - - -

AMPCO METAL; No. 16; copper 87.30, iron 3.40, aluminum 9.15, No. 18; copper 86.50, iron 3.75, aluminum 9.50. No. 20; copper 85.50, iron 4.25 aluminum 10.00 per cent. No. 21; copper 82.50, iron 5.25, aluminum 12.00; for forming dies, welding jaws, bushings, gears, pickling equipment, nonfatiguing parts, etc. Ampco Metal Inc., Milwaukee.

1 2 3 4 5 - - 8 - 10

AMSCO; six grades of alloys, particularly heat resistant; also resistant to acid and corrosive substances, as well as abrasion resistant and suited to heat treatment. Grade F-1; chromium 16 to 29, nickel 35 to 38. F-2; chromium 26 to 29, nickel 0 to 3. F-3; chromium 26 to 29, nickel 0 to 3, high carbon. F-5; chromium 18 to 21, nickel 62 to 65. F-8; chromium 18 to 21, nickel 8 to 11. F-10; chromium 26 to 29, nickel 10 to 13. For heat treating furnaces, ore roasting furnaces, paper mill machinery and cement mill machinery. Manganese steel castings; manganese 10 to 14, carbon 1 to 1.40; primarily abrasion resistant; also resistant to shock; high tensile strength and ductility; for power shovel dippers, teeth, crawler shoes, crusher mantles, jaws, dredge pumps, and wearing parts for excavating, and other types of equipment. American Manganese Steel Co., Inc., Chicago Heights, Ill.

1 2 3 4 - 6 7 8 - -

ANACONDA; beryllium copper, copper 97.75, beryllium 2.25 per cent; for springs, diaphragms, low duty bushings and bearings and Bourdon tubes, also parts requiring high resistance to fatigue. American Brass Co., Waterbury, Conn.

1

APOLLOY METAL; resistant to corrosion; carbon .08, manganese .40, sulphur .025, phosphorus under .045 and copper .25 per cent. Apollo Steel Co., Apollo, Pa.

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ARMCO: Tran-Cor 64; high silicon steel for distribution transformers. Tran-Cor 70; high silicon steel sheets with low core loss; for power and distribution transformers. Tran-Cor 76; high silicon steel for general transformer work and large generators. Intermediate Transformer; a scale free silicon steel sheet for some transformers and special applications; Armco Special Electric; a scale-free medium steel sheet for a.c. motors and generators. Armco Electric; a special analysis sheet for rotating machines. Armature; steel sheet for small d.c. motors. Radio No. 6; for applications in which superior low induction magnetic characteristics are important. Radio No. 5; for audio transformer cores and other low induction applications. Radio No. 4; good permeability at low induction; for chokes. Radio Nos. 3, 2, 1; for small transformers. Armco ingot iron; highly refined iron for magnetic cores; supplied in round and flat bar form. American Rolling Mill Co., Middletown, O.

- - 3 4 - - - 8 - -

ATLAS; No. 93, grade 38; chromium .65, molybdenum .35; for collets, studs and parts requiring toughness in hardened condition. Ludlum Steel Co., Watervliet, N. Y.

Additions to listings:

B

1 2

B & W; Alloy 5; chromium molybdenum; oxidation resistant; 4 to 6 per cent chromium for oil refinery service. No. 5; also 4 to 6 per cent chromium; for oil refinery service; similar properties. Alloy 18-8 low carbon; resistant to corrosion, heat, scale and creep. Alloy 18 is 18 per cent chromium steel for high temperature work if no long heating is involved. Alloy 18-8; resistant to scale, corrosion, heat; general purpose alloy for use similar to alloy 18-8 low carbon, except that for pressure service the temperature should not exceed 600 degrees Fahr. Babcock & Wilcox Tube Co., New York.

1 2 - - - 7 - -

BAKER; platinum and alloys; for linings, contacts, thermocouples, furnace resistors, etc. Baker & Co. Inc., Newark, N. J.

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BARBERITE; alloy made up of 88.5 per cent copper, 5 nickel, 5 tin and 1.5 per cent silicon; for applications where dilute sulphuric acid concentrations are below 60 degrees Be' and temperature below 96 degrees Cent. Barber Asphalt Co., Philadelphia.

1 - - - - 6 - - - 10

BEARIUM METAL; in addition to heat resistance has low coefficient of friction; composed of copper, tin, lead combined by special process and supplied in several grades and analyses to meet specific operating conditions. Bearium Metals Corp., Rochester, N. Y.

1 2 - - -

BETHADOUR; corrosion and heat resisting steels for virtually all purposes except those calling for free machining. Bethlehem Steel Co., Bethlehem, Pa.

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BETHALON; free machining, nonrusting, high chromium steel for a variety of machine parts. Bethlehem Steel Co., Bethlehem, Pa.

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BIRDSBORO; No. 26 has high physical properties including high tensile strength. No. 30; corrosion and fatigue resisting. Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.

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BLACKOR; for use where resistance to abrasion is primary consideration; tungsten carbide specially processed for electrical arc welding application; for oil well tools, grading and agricultural machinery, coal mining equipment, airplane skid shoes, etc. Blackor Co., Los Angeles, Calif.

- - - - - 9

BOHNALITE; a light alloy of which aluminum is the base; for forged connecting rods, cast cylinder heads, crank cases, transmission cases, bearing caps, vacuum cleaners, washing machines, shoe machinery, etc. Bohn Aluminum & Brass Corp., Detroit.

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BONNEY-FLOYD; MM alloy steel, manganese, molybdenum, and .25 to .35 carbon; cast steel with high physical properties for general purposes. Quenched, tempered low carbon steel; carbon .25 to .35, manganese .7 to .90, silicon .40 max., sulphur and phosphorus .05 maximum; general steel casting requirements where high strength and shock resistance are required. NCM alloy steel; nickel, chrome, molybdenum, carbon .25 to .35, for bucket lips, bucket teeth, dragline clevises and other uses where abrasion is encountered in the design of machines and equipment. Bonney-Floyd Co., Columbus, O.

- - - - - 6

BUNTING; a line of some one hundred and sixty odd bearing bronzes to any desired specification, sand or chill cast; for sleeve bearings etc. friction rings and special applications. Bunting Brass & Bronze Co., Toledo, O.

Additions to listings:

C

1 2 - - - 4 5 - - - 10

CALITE: "A", a nickel-chromium-iron alloy available in the form of castings and rolled bar stock; readily machinable. Type "B"; cast form only for oil refining industry. "B-28"; available as castings, sheet and bar stock; possesses extreme stiffness at all temperatures and is corrosion resistant. "N"; nickel-chromium-iron in sheets, bars, castings. "S"; malleable alloy steel, greatest utility in form of hot rolled sheets for corrosion work at moderate temperature; may be flanged, punched or assembled by welding. "E"; a malleable alloy steel in form of bars and sheets; not affected by weather corrosion, sulphur compounds and many organic acids and inorganic salts. Also Calite-Nirosta stainless steels in cast form. The Calorizing Co., Pittsburgh.

- 2 3 4 - 6 - - -

CANNONITE; electric furnace high test cast iron; total carbon 2.75 to 3 per cent; for diesel and automobile cylinders, centrifugal sleeves and brake drums, gas tight castings, presses, dies, etc. Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich.

1 2 3 4 5 6 7 8 - 10

CARPENTER; stainless steel, No. 1; corrosion, heat resistant, high tensile strength; carbon .10, chromium 12 to 15; for stampings, turbine blades, pump shafts and many heat treated parts. No. 2; corrosion, abrasion resistant, high tensile strength; carbon .30, chromium 13; used in fully hardened condition for tapes, ball bearings, ball check valves, etc. 2-B; corrosion, abrasion resistant, high tensile strength; carbon .95, chromium 17; for ball bearings, ball check valves, etc. No. 3; corrosion, heat resistant; carbon .3, chromium 20, copper 1, for special chemical apparatus and scale resisting parts. No. 4; corrosion, heat resistant, high ductility; carbon .10, chromium 18, nickel 9. No. 5; heat, corrosion, abrasion resistant, high tensile strength; carbon .10, chromium 14, sulphur .30; a free machining grade for parts made on automatic screw machines or machined from forgings. No. 6; corrosion resistant; carbon .10, chromium 17. No. 8; corrosion, heat, abrasion resistant, high ductility, electrical uses; carbon .10, chromium 18, nickel 9, selenium .25; a free machining grade. No. 5-317 chrome-nickel steel; abrasion resistant, high tensile strength; carbon .50, nickel 1.75, chromium 1; used for gears, clutches and shafts. No. 4-408; abrasion resistant, high tensile strength; carbon .40, nickel 3, chromium .75; for clutches and shafts. No. 158; abrasion resistant, high tensile strength and ductility; carbon .10, nickel 3.50, chromium 1.50; for case hardened high duty clash gears, shafts, clutch parts. No. 4 Samson steel; abrasion resistant, high tensile strength; carbon .40, nickel 1.25, chromium .60; for

shanks of high speed tools, side links of silent chains, etc. No. 2; abrasion resistant, high ductility, carbon .20, nickel 1.25, chromium .60; used for gears, roller bearings, pneumatic tool parts, etc. N-30 steel; 30 per cent nickel; for electrical parts, nonmagnetic, special thermal expansion properties. No. 3-547 nickel steel; abrasion resistant and high strength; carbon .30, nickel 3.50; for heat treated shafts, etc. No. 547 case hardening nickel steel; abrasion resistant, high ductility; carbon .20, nickel 3.50; for small parts requiring hard surface and tough core. No. 500; carbon .10, nickel 5; for turbine blades, case hardened gears, etc. Chrome magnet steel; carbon .95, chromium 3.50; for magnets in meters and other electrical apparatus. Presto steel; carbon 1.05, chromium 1.40; for ball and roller bearings. Chrome vanadium 5-720; carbon .50, chromium .90, vanadium .20; for leaf and coil springs, gears, shafts, etc. No. 3-427 chrome molybdenum steel; abrasion resistant, high tensile strength; carbon .30, chromium 1, molybdenum .20; for aircraft and automotive parts. No. 436; abrasion resistant, high ductility; carbon .15, nickel 1.75; molybdenum .25; for case hardened parts. Silico-manganese steel; carbon .60, manganese .75, silicon 2; for heavy-duty springs. Carpenter Steel Co., Reading, Pa.

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CASTALOY; air hardening tool steel castings; chromium 12 to 14 and carbon 1.5 to 1.6 per cent. Detroit Alloy Steel Co., Detroit.

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CATARACT METAL; corrosion resisting, nickel copper for introduction into alloy casting metal. Niagara Falls Smelting & Refining Corp., Buffalo.

1 - - 4 5 - - -

CHAMET BRONZE; principally corrosion resistant; copper 60, tin .75,

zinc 39.25; for general use where strong corrosion resistant brass is required. Chase Brass & Copper Co. Inc., Waterbury, Conn.

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CHASE; free-turning bearing bronze; copper 88, lead 4, tin 4, zinc 4; for automotive and other bearings; also automatic screw machine parts requiring good physical properties and high corrosion resistance. Nickel aluminum bronze; principally corrosion resistant; copper 92, nickel 4, aluminum 4; for use where combination of good physical properties and corrosion resistance is desired; particularly recommended for condenser tubes in oil refineries or where temperatures are not higher than in the usual surface condensers. Chase Brass & Copper Co. Inc., Waterbury, Conn.

2 - - - - -

CHRISTITE No. 1; heat-resisting alloy; tungsten 17, chromium 10 and molybdenum 2.5 per cent. Commercial Alloys Co., San Francisco, Calif.

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CHROMAX; cast; nickel 35, chromium 15 per cent; for furnace parts, carburizing containers, enameling racks and fixtures, conveyor chains, etc. Driver-Harris Co., Harrison, N. J.

2 - - - - -

CHROMEL: No. 502 is heat resistant; 18 to 22 per cent chromium, 30 to 34 nickel, balance mainly iron; for burning tools in the enameling industry and for metal furnace parts. Grade A; heat resistant; 80 nickel, 20 chromium; used for electric heating elements. Hoskins Mfg. Co., Detroit.

3 - - - - -

CHROMONITE; hard alloy chill roll made in three grades, mild, medium, and hard; for special applications. Continental Roll & Steel Foundry Co., East Chicago, Ind.

1 2 3 - - - - -

CIMET; cast, particularly corrosion resistant; nickel 10, chromium 7; for furnace parts in high sulphur atmospheres, acid resisting castings such as impellers, pumps, piping, etc.; stainless casting. Driver-Harris Co., Harrison, N. J.

1 2 3 4 5 - 7 8 9 -

CIRCLE L; No. 1; high strength and ductility castings; medium manganese, carbon .30 to .40. No. 2; high tensile strength and ductility; carbon .30 to .40, chromium 1, molybdenum .30; for crankshafts, rocker arms, airplane parts, etc. No. 3; abrasion resistant, high tensile strength and ductility; carbon .40 to .50, chromium 1.25, molybdenum .40; for gears, cams, digger and dredge teeth. No. 4; abrasion resistant, high tensile strength; carbon .50 to .80, chromium 1.25 to 2.00, molybdenum .50 to 1; for cams, crusher jaws, etc. No. 6; case hardening alloy, abrasion resistant, high tensile strength and ductility; carbon .18, nickel 1.75, molybdenum .25; for parts carburized and hardened. No. 8; nitriding steel, abrasion resistant, high tensile strength; carbon .25, chromium 1.50, vanadium .50. No. 10; high tensile strength and ductility; carbon .20, chromium 5, molybdenum .50; for high pressure and high temperature applications in the oil industry. No. 11; carbon .25, chromium 17 to 20, copper 1; for parts subjected to heat and corrosion. No. 12; corrosion resistant, high tensile strength and ductility; carbon .10, chromium 13, nickel .50 max.; for valves, fittings and pumps in the oil industry. No. 15; heat and corrosion resistant; carbon .30, chromium 28.50, nickel .50 max.; nitric acid resisting. No. 22; heat and corrosion resistant, high tensile strength and ductility, low specific gravity; carbon .07 max., chromium 17 to 20, nickel 8 to 10; for severe corrosive conditions and for parts fabricated by welding. No. 23; heat, corrosion resistant, high tensile strength and ductility, electrical uses; carbon .15, chromium 17 to 20, nickel 8 to 10;

hydrogen sulphide, mild sulphuric acid and other corrosive applications. No. 24; corrosion resistant, high tensile strength and ductility; carbon .15, chromium 8 to 10, nickel 17 to 20. No. 25; corrosion, heat resistant, low specific gravity high tensile strength and ductility; carbon .15, chromium 20 min., nickel 9; for valves and pump parts for the paper industry. No. 30; properties and uses same as No. 25; contains .15 carbon, 25 chromium, 10 nickel. No. 31; properties also similar to No. 25 with addition of heat treating; carbon .25, chromium 28, nickel 11; resistant to oxidation at high temperatures. No. 32; heat, corrosion resistant, high tensile strength and low specific gravity; carbon .50, chromium 16, nickel 35; good resistance to sulphuric acid. Lebanon Steel Foundry, Lebanon, Pa.

6
CLOVERLEAF; babbitt metal; for bushings, bearings. E. A. Williams & Son Inc., Jersey City, N. J.

3
CNM; chrome nickel alloy possessing wear resisting qualities. George H. Smith Steel Casting Co., Milwaukee.

10
COBALTCROM "PRK 33"; a nonde-forming, air hardening steel; chromium 12 to 14, cobalt .7 to .9 and carbon 1.5 to 1.6 per cent. Detroit Alloy Steel Co., Detroit.

7
COMET; nickel 31, chromium 2, balance iron; for heavy duty rheostats, elevator and crane controllers. Driver-Harris Co., Harrison, N. J.

6
COMMERCIAL; for bearings, bushings and bars; copper 83, tin 7, zinc 7 and lead 3 per cent. Buckeye Brass & Mfg. Co., Cleveland.

6
COMPO; strong, die-pressed porous bearing bronze; made of powdered metals by patented process; for self-lubricating bearings used in the automotive industry, household appliances, textile machines, etc. Bound Brook Oil-Less Bearing Co., Bound Brook, N. J.

1
CORROSOIRON; an acid resisting iron; silicon 13.50, iron 85.5 per cent. Pacific Foundry Co., San Francisco, Calif.

3
CROCAR; carbon 2.20, chromium 12.00 per cent; for parts to resist excessive wear. Vanadium-Alloy Steel Co., Latrobe, Pa.

4 5 6 8
CROMANSIL; high tensile strength and ductility; chrome .50, manganese 1.20 and silicon .75 per cent; applications include planer ways. Lukens Steel Co., Coatesville, Pa.

7
CROMIN D; nickel-chromium-iron for electrical uses; high resistivity, for use in low temperature work. Gilby Wire Co., Newark, N. J.

3
CRO MOL; C-9 and C-10; chrome molybdenum cast steel for hammer parts, rams, dies, and saw blocks. Continental Roll & Steel Foundry Co., East Chicago, Ind.

1 2 6
CRUCIBLE; stainless irons; a group of steels containing 12 to 30 per cent chromium, including No. 12 (12 to 15 chromium); No. 2 (12 to 15 chromium); No. 18 (16 to 19 chromium); No. 21 (19 to 23 chromium); No. 27 (23 to 30 chromium); No. 182 (18 chromium, 2 nickel); all have .12 max. carbon. Stainless steels; a group similar to

the foregoing except having a higher carbon content; used mainly for bearings, etc. where hardness and resistance to corrosion is desired; Stainless A (.3 carbon, 12 chromium); B (.60 carbon, 16 chromium); Stainless H.C. (1.00 carbon, 20 chromium with vanadium and molybdenum). Rezistals; KA2 (18 chromium, 8 nickel) and its modifications; No. 3 (22 chromium, 12 nickel, 2.50 silicon); No. 4 (20 chromium, 25 nickel, 2.50 silicon); No. 7 (NCT3) (25 chromium, 25 nickel, 1.00 silicon). Nitrallloy; alloy steel of the standard patented chrome-aluminum-molybdenum analysis; additional compositions featuring aluminum and high molybdenum, as well as special chrome-vanadium combinations. Crucible Steel Co. of America, New York.

7

CUPRON; nickel copper alloy for rheostats, voltmeters, shunts and other resistances operated below red heat; has moderate resistivity. Gilby Wire Co., Newark, N. J.

1

CYCLOPS; No. 17; a noncorrosive steel for pump rods, still plugs, thermocouple wells, turbine blades, etc. Stainless grade A; chromium 12.50, nickel .50 max. Grade B; chromium 17, nickel .50 max. Cyclops Steel Co., Titusville, Pa.

Additions to listings:

D

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DAVIS METAL; a corrosion resisting iron; for valves and fittings; carbon and silicon .5, manganese 1.5, nickel 29, iron 2, copper 67 per cent. Chapman Valve Mfg. Co., Indian Orchard, Mass.

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DEFIHEAT; major property is heat resistance; carbon .20 max., manganese .25 to .80, phosphorus .035, sulphur .035, silicon 1.00, chromium 26 to 29; will withstand temperatures up to 2100 degrees Fahr. indefinitely. Rustless Iron Corp. of America, Baltimore.

1 2 - 4 5 - - 8 - -

DEFIRUST; corrosion resistance is principal property; carbon under .10, manganese .25 to .60, phosphorus .035, sulphur .035, silicon .50, chromium 12 to 14.50. Special Defirust; corrosion, heat resistant, high ductility; carbon .10 max., chromium 16 to 18, other elements in same percentages as in above alloy. Rustless Iron Corp. of America, Baltimore.

1 2 - 4 5 - 7 - -

DEFISTAIN; corrosion and heat resistance are major properties; carbon .18 and .07, manganese .25 to .60, phosphorus .035, sulphur .035, silicon .75 max., chromium 17 to 19, nickel 8 to 10; retains high tensile strength and resistance to creep up to 1300 degree Fahr.; is non-magnetic. Rustless Iron Corp. of America, Baltimore.

- 3 - - - 8 - -

DEWARD; grade 8; carbon .9; manganese 1.50, molybdenum .30; for holders for thread chasers and gang punches. Ludlum Steel Co., Watervliet, N. Y.

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DIAMOND G BRONZE; for bearings,

bushings and mill brasses. E. A. Williams & Son Inc., Jersey City, N. J.

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2

DM STEEL; exceptionally good resistance to creep up to 1200 degrees Fahr. combined with fair oxidation and corrosion resistance; carbon under .20, manganese .30 to .60, silicon .75 to 1.25, chrome 1 to 1.50, molybdenum .40 to .60, phosphorus .04 max., sulphur .04 max.; for power and oil refinery equipment such as tubing. Timken Steel & Tube Co., Canton, O.

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DOWMETAL; Grade A; high tensile strength and ductility, good machinability and low specific gravity, this being the major characteristic; magnesium 91.8, aluminum 8, manganese .2; castings for aircraft, portable machinery, etc. Grade F; properties similar to A; magnesium 95.7, aluminum 4, manganese .3; sheet and wrought shapes for aircraft and transportation industry. Grade G; magnesium 89.9, aluminum 10, manganese .1; castings for aircraft and portable machinery requiring high yield strength rather than high ductility. Grade M; possesses good machinability and in addition is corrosion resistant; magnesium 98.5, aluminum 1.5; sheet and wrought shapes principally for the aircraft industry for stressed parts requiring maximum resistance to salt water. Dow Chemical Co., Midland, Mich.

4

5

DUPLEX; forging steel; nickel 3.50, chromium 1.50; for shafts and machine parts where high strength and toughness are required; also made in case carburizing type. Crucible Steel Co. of America, New York.

3

DUQUESNE SPECIAL; chrome molybdenum steel for rolls subject to severe service; also for abrasive

castings. Continental Roll & Steel Foundry Co., East Chicago, Ind.

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DURALLOY; 1 to 2 chromium, 1 to 3.50 nickel; steel castings for treads, gear blanks, etc. West Steel Casting Co., Cleveland.

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DURALLOY; A (27 to 30 chromium), B (16 to 18 chromium), C (12 to 14 per cent chromium), N (21 to 24 chromium, 12 nickel), 18-8 (18 chromium and 8 nickel), 15-35 (15 chromium, 35 per cent nickel); for corrosion resisting castings. Duraloy Co., Pittsburgh.

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8

DURCO; alloy steels (KA2S, KA2SMO, etc.); 18 chrome, 8 nickel, carbon maximum .07 per cent, and other standard as well as special analyses preferred by users; for pumps, valves, fittings, castings for corrosive service. Duriron Co. Inc., Dayton, O.

6

DUREX; principally used for bearings; copper 85 to 88 per cent, tin 9.4 to 9.8 per cent, graphite 2 to 6 per cent; for bearings for motors, automobiles, washing machines, electric refrigerators, farm implements, etc. Moraine Products Co., Dayton, O.

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7

DURICHLOR; silicon 14, molybdenum 4, carbon .80, traces of phosphorus and sulphur, balance iron; for pumps, valves, pipe, castings for corrosive service, especially for hydrochloric acid and chloride solutions. Duriron Co. Inc., Dayton, O.

1

2

DURIMET; nickel 23 per cent, chromium 20, silicon 3, molybdenum 1.25, copper 1, carbon .07, balance iron; for pumps, valves, bolts, nuts and

castings for corrosive service.
Duriron Co. Inc., Dayton, O.

1 - 3 - - - 7 - - -

DURIRON; silicon 14.50, carbon .80, manganese .60, sulphur and phosphorus traces, balance iron; for pumps, valves, ejectors, exhaust fans, mixing nozzles and special equipment and castings for handling acids and other corrosive liquids and gases. Duriron Co. Inc., Dayton, and licensees including Shawinigan Chemicals Ltd., Montreal, Que.

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DUTCH BOY BABBITT; for bearings; analysis varies for different applications. National Lead Co., New York.

1 - 3 - - - 8 - 10

DYNAMIC STEEL; C-2; low carbon, manganese, nickel cast steel for parts requiring high physical properties; for tractor frames, locomotive castings, material moving machinery. C-3; medium carbon, manganese, nickel cast steel for resisting wear after a preferential heat treatment; for sprockets, spindles, wheel centers, crossheads, etc. C-6; high chromium cast steel for special abrasive and crushing work; for sand mills, rock crushers, etc. Continental Roll & Steel Foundry Co., East Chicago, Ind.

Additions to listings:

E

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ECONOMO; free machining; .20 and .50 carbon with alloy of molybdenum; for machine tool parts. Wheelock Lovejoy & Co. Inc., Cambridge, Mass.

ELECTROMET; a line of ferro-alloys and alloying elements of various analyses. Electro Metallurgical Co., New York.

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ELINVAR; alloy with low coefficient of elasticity; nickel 33 to 35 per cent, iron 53 to 61, chromium 4 to 5 per cent, tungsten 1 to 3, manganese .5 to 2, silicon .5 to 2, carbon .5 to 2 per cent; for watch and instrument hairsprings, and tuning forks; made by Acieries d'Impy, France. Marketed in the United States and Canada by R. Y. Ferner Co., Washington.

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ELVERITE; special castings with wear-resisting qualities; for tube mill linings, wheels, jaw crushers, sprockets, etc. Fuller Lehigh Co., Fullerton, Pa.

1 2 3 4 5 - - - -

EMPIRE; alloy steel castings to all standard chrome-nickel specifications. Empire Steel Castings Inc., Reading, Pa.

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ENDURIA; a special carbon spring steel. Bethlehem Steel Co., Bethlehem, Pa.

1 2 - - - -

ENDURO; 18-8, 18 chromium and 8 nickel; AA, 18 chromium; S and S-15, 13 per cent chromium; stainless irons resistant to heat and corrosion. AA; heat resisting alloy; chromium 16.5 to 18.5, silicon .75,

carbon .1 max. Republic Steel Corp., Youngstown, O.

- - - 3 4 5 - - -

ERMAL; high tensile, close grained, ductile iron; for all general castings; excellent in resistance to wear by friction or abrasion. Erie Malleable Iron Co., Erie, Pa.

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ERMALITE; wear resisting alloy iron; for gears, wearing plates, friction drums and other parts subject to high stresses or wear. Erie Malleable Iron Co., Erie, Pa.

- - - 4 5 6 7 - - -

EVANSTEEL; nickel 1 to 1½ per cent, chrome .65 to 1, carbon varies from .30 to .50, sometimes carries additions of vanadium or molybdenum; for castings such as passenger car buckles, tooth bases, sprockets, gears, high pressure valves, etc. Chicago Steel Foundry Co., Chicago.

1 - - 4 5 - - - - 10

EVERDUR; grade A; copper 96, silicon 3, manganese 1. B; copper 98.25, silicon 1.50, manganese .25; for strength and resistance to corrosion; easily fabricated by all methods including welding. Uses for grade A include boilers, tanks, sewage disposal and water treatment apparatus; B is used for tubes, bolts and screws. American Brass Co., Waterbury, Conn.

Additions to listings:

F

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FAHRITE; N-1 and N-5; heat resistant. N-1; carbon .40 max., nickel 35 to 38, chromium 15 to 18. N-5; carbon .40 max., nickel 60 to 65, chromium 12 to 14; for mechanical furnace parts, etc. N-2; corrosion resistant; carbon .25 max., chromium 18 to 20, nickel 8 to 10; for valves and pressure castings, etc. N-3; corrosion and heat resistant; carbon .40 max., chromium 24 to 26, nickel 8 to 9 per cent; for mechanical furnace castings, etc. Ohio Steel Foundry Co., Springfield, O.

- - - 3 4 5 - - - - 10

FARRELL'S 85; specially processed steel castings for resisting abrasion; possessing high strength, toughness and rigidity. Farrell-Cheek Steel Foundry Co., Sandusky, O.

- - - 2 - - - -

FIRE ARMOR; castings resistant to high temperatures; nickel 60, chromium 20, iron 10, manganese 1.75, and carbon 0.5. Michiana Products Corp., Michigan City, Ind.

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FEDERAL-MOGUL; bearing bronzes; F1; a good gear bronze and is suitable for heavily loaded piston pin bushings, etc. F2; one of the strongest and hardest of the lead bronzes for average bushing application. F8; good casting and machining qualities. F15; has 20 per cent lead and may be used safely under adverse lubrication conditions. F5; widely used for babbitt lined bearing backs and for bushings where service is not severe. F16; because of high lead content may be used where only occasional lubrication is possible. F3; used largely as backs for babbitt lined bearings. F6; for average bushing applications. F11; for piston pin bushings and other low speed, heavily loaded applications. F13; suitable for many of the uses to which F1 is applied. F19; strong ductile alloy of average hardness with

bearing qualities corresponding to other low lead compositions. F 18; high lead alloy of good casting characteristics. Federal-Mogul Corp., Detroit.

- 3 -

FLINTCAST; an abrasion-resisting iron. Pacific Foundry Co., San Francisco, Calif.

Additions to listings:

G

- 1 - - 5 - -

GOHI; iron-copper alloy; .02 per cent carbon, manganese .025, sulphur .025, phosphorus .005, silicon .003, copper .25 per cent; for any sheet or plate application where corrosion resistance and ductility are a consideration as in ventilating systems, fabricated sheet metal parts, etc. Newport Rolling Mill Co., Newport, Ky.

- 4 -

GUNITE; low carbon high test cast iron; for brake drums, clutch plates, glass molds, cylinders, dies, hydraulic castings, and machine tool parts. Gunite Foundries Corp., Rockford, Ill.

Additions to listings:

H

- 1 2 - - - - 10

HALCOMB; stainless steels; Grade A; chrome 12.5. B; chrome 17. Stainless irons, FM2; chrome 12; for free machining, corrosion resistant. No. 12; chrome 12 to 13. No. 16; chrome 15 to 16. No. 18; chrome 18 to 20. No. 24; chrome 24 to 26. N. C. R. 238; heat and corrosion resistant. Rezistal; stainless steels made in various grades, corrosion, heat resistant. Halcomb Steel Co., Syracuse, N. Y.

- 2 3 - - - - 10

HARDTEM; abrasion resistance is primary property; carbon .5, nickel chrome molybdenum die steel; for die blocks, upsetter blocks, shafting applications. Heppenstall Co., Pittsburgh.

- 1 - 3 - - - -

HAYNES STELLITE; major property is abrasion resistance; nonferrous cobalt-chromium-tungsten alloy for metal cutting tools, hard facing welding rod for parts subjected to abrasion or a combination of abrasion, heat and corrosion. Haynes Stellite Co., New York.

- 3 -

HAYSTELLITE; primarily resistant to abrasion; cast tungsten carbide; for inserts and composite rod (welding rod) for oil well drilling tools, dredge cutter blades, etc. Haynes Stellite Co., New York.

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HASTELLOY A, C and D; principally resistant to corrosion. A is comprised of nickel, molybdenum and iron. C; nickel, molybdenum, chromium and iron. D; nickel, silicon, copper and aluminum; for corrosion resistant piping, tanks, pump parts, valves, vessels, etc. Haynes Stellite Co., New York.

- - - 4 5 - - - - 10

HEPPENSTALL; Grade 2C 30; high impact strength is major property;

nickel chrome molybdenum steel, .3 per cent carbon; for shafting where high torsional strength is required such as drop hammer piston rods. Heppenstall Co., Pittsburgh.

1 - 3 4 5 - 7 8 - -

HERCULOY; silicon bronze; copper 94.75, silicon 3.25, tin .50, zinc 1.50; corrosion, abrasion resistant, high strength and ductility, nonmagnetic; obtainable in form of strip, sheets, plates, cold drawn rods, shafting, welding rod, forgings, ingot form for sand casting; for piston rods, shafting, electrical construction, etc. Produced by Revere Copper & Brass Inc., New York.

- - - 4 - 6 - - -

HIGH TEST; nickel cast iron possessing high tensile strength; nickel 1 to 1.25, total carbon 2.75 to 3.15, manganese .60 to 1, silicon .9 to 1.10 per cent; for brake drums, diesel engine liners and heads, paper and printing press rolls, and valve bodies. International Nickel Co. Inc., New York, and licensees.

1 - 3 4 - - - -

HIOLOY; .0-3; carbon .35 max., nickel 1 to 1.75, chrome .40 to .80, molybdenum .20 to .30; parts for refinery equipment where strength is major consideration. 0-4; carbon .32 max., chrome 4.00 to 6.00, molybdenum .50 to .65 per cent; for refinery fittings to resist corrosion. 0-6; abrasion resistant; carbon .75 max., chrome .80 to 1.20, vanadium .15 to .22; for cement mill liners and screen plates, conveyor pipe for abrasive materials, sand mill parts, etc. Available in cast form. Ohio Steel Foundry Co., Springfield, O.

- - - - 6 - - - -

HOYT BABBITT METAL; for bearings; analysis varies according to application. National Lead Co., New York.

- - - 3 - - - -

HUBBARD SPECIAL; nickel chrome steel for wear resisting rolls, guides,

and miscellaneous castings. Continental Roll & Steel Foundry Co., East Chicago, Ind.

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HY-B-LUM; a corrosion resisting, general purpose alloy containing nickel, copper, silicon and pure aluminum. Produced by Sheet Aluminum Corp., Jackson, Mich.

1 2 - - - - -

HYBNICKEL, "A," "B," "C," "D," "R" and "S;" a series of nickel-chromium alloys for heat and acid resistance. Victor Hybinette, Wilmington, Del.

1 - - - - - 9 -

HYDRONALIUM; aluminum alloys resistant to corrosion, especially in sea water; magnesium 5 to 15 per cent, with traces of manganese. For ships and aircraft. Bitterfeld Works of I. G. Farbenindustrie A-G., Germany.

- - - - 4 - - - -

HYLASTIC; greater strength with no increase in weight; carbon .35, manganese 1.50, phosphorus .05, sulphur .05. Available in cast form. American Steel Foundries, Chicago.

- - - - 6 - - - -

HY-SPEED; for bushings, bearings and bars; copper 88, tin 7 and zinc 2 per cent. Buckeye Brass & Mfg. Co., Cleveland.

1 - - - - - 7 - - -

HYTEMCO; for electrical uses primarily; nickel 70 per cent, balance iron; ballast resistances, heater pad element material, resistance thermometers, etc. Driver-Harris Co., Harrison, N. J.

- - - 3 4 5 6 - 8 - -

HY-TEN; .10 to 1 carbons of chrome-manganese-molybdenum and chrome-nickel-molybdenum alloys; for small

tools and machine tool parts. Wheelock-Lovejoy & Co. Inc., Cambridge, Mass.

Additions to listings:

per cent. Industrial Steels Inc., East Cambridge, Mass.

1 2 - 4 5 - - -

ING O CLAD; stainless clad steel; consisting of a 20 per cent stainless layer of 18-8 chrome nickel, or 20-10 chrome nickel, or straight 16-18 chrome bonded to a back of soft carbon steel. Uses include equipment for chemical plants, and the food, dairy, processing, brewery and packing house industries, and other fabricating units requiring a stainless steel surface on one side. Ingersoll Steel & Disc Co., division of Borg-Warner Corp., Chicago.

I

1 2 - - -

ILLIUM; alloy consisting primarily of nickel, chromium, copper, molybdenum and tungsten; for resistance to sulphuric acid, nitric acid and other highly corrosive conditions in the chemical industry. Burgess-Parr Co., Moline, Ill.

1 2 3 4 5 - - -

INCONEL; nickel 80, chromium 14 and iron 6 per cent; principal applications include handling of food products of which non-contamination is desired, springs, high temperature applications. International Nickel Co. Inc., New York, and licensees.

1 - 3 4 5 - - - 10

INDUSTRIAL; Super-Duct F-3; high strength and ductility, resistant to abrasion; chromium .80, nickel 1.75, molybdenum .35 per cent; for shafts, studs, etc. Stainless steel No. 35; chrome 13 to 14, carbon .30 to .40; No. 65, chrome 16 to 17, carbon .60 to .70; No. 100; chrome 17 to 18, carbon .9 to 1. Stainless iron, No. 512; free machining, chromium 11½ to 13; No. 12, 11½ to 13; No. 18; chromium 16 to 20; No. 188; chromium 17 to 20, nickel 8 to 10; No. 5188 free machining; chromium 17 to 20, nickel 8 to 10; No. 188 M; chromium 17 to 20, nickel 8 to 10, molybdenum 2 to 4

1 - - -

INLAND; copper bearing steel used largely for sheets; corrosion resisting; copper minimum .20 per cent. Silico-manganese spring steel. Inland Steel Co., Chicago.

10

INVAR; an alloy with a low coefficient of thermal expansion; nickel 36 per cent; iron 61 to 64, carbon 0 to 1 per cent, manganese .1 to 1 and silicon .1 to 1 per cent; for clock pendulums, scientific instruments, and struts for auto pistons; made by Acieries d'Imphy, France. R. Y. Ferner Co., Washington, is exclusive agent in United States and Canada.

3 - - -

IRONITE; wear resisting castings; nickel, vanadium and chromium composition. Kinite Corp., Milwaukee.

Additions to listings:

J

- 2 3 4 5 6 - - -

JEWELL ALLOY; carries 1.25 nickel, 2.50 total carbon, .90 silicon and .3 chromium; castings for machine parts, cams, compressor valve seats and valve inserts. Jewell Steel & Malleable Co., Buffalo.

- - - - 6 - - -

JOHNSON; bronze alloy, No. 19; high wear rating and resistance to pounding; copper 70, tin 11, lead 19; for mill bearings, gas and diesel engines, excavating, pulverizing and general machinery bearings. No. 25 (plastic bronze); copper 75, tin 5, lead 19, nickel 1; for high speed with light to medium load and generally free from shock; because it has good acid resistance it is particularly suitable for pump bearings and sleeves, also for electric motor, conveyor and fan, and wood working machine bearings. No. 27; copper 80, tin 10, lead 10, deoxidized with phosphorus; for locomotive crossheads and crank pin bearings, lathe, and grinder and other high speed applications. No. 29; copper 78, tin 7, lead 15; for use where spindle is of soft steel and speed relatively high; acid resisting alloy. No. 53; copper 88, tin 10, zinc 2; good bronze for severe service or heavy pressures; should be used where shaft is hardened steel and well lubricated. No. 72; copper 83, tin 7, lead 7, zinc 3; best suited for moderate speeds and low loads. Babbitt alloy, No. 10; tin 90, antimony 5, copper 5; suitable for thin linings and also may be used in die castings. No. 11; tin 87, antimony 7, copper 6; rather hard babbitt recommended as lining for connecting rods and shaft bearings subjected to heavy pressures. No. 12; tin 90, antimony 7.5, copper 2.5; for high speeds and acts well where higher temperatures are encountered. Johnson Bronze Co., New Castle, Pa.

*Additions to listings:***K**

- - - 3 - - - - 10

KINITE; high carbon steel castings; resistant to abrasion and compression; for cutters, mandrels, machine parts, press tools, etc. Kinite Corp., Milwaukee.

- - - - 3 - - -

KLEENKUT; tool steel containing 2 carbon and 12 per cent chromium; for shear knives for cold shearing light material. Heppenstall Co., Pittsburgh.

- 1 2 - 4 5 - 7 8 - -

KONAL; analysis depends on application, broadly nickel-cobalt alloys with substantial percentages of iron, titanium and chromium; for thermionic filaments, internal combustion engine valves, molds and machine parts subject to stress at temperatures up to 650 degrees Cent. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

- - - - 5 - 7 - - 10

KOVAR; low expansion to 400 degrees Cent.; approximately 30 per cent nickel, 15 cobalt and 55 iron; for sealing into hard glass, mercury arc rectifiers. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

*Additions to listings:***L**

- 2 - - - -

LO-CRO; 46 (5 chromium) including 46Mo. (5 chromium, .50 molybdenum)

and 46W; widely used where resistance to scaling up to 1200 degrees Fahr. is desired and where high strength at elevated temperatures up to 1200 degrees Fahr. is required. Crucible Steel Co. of America, New York.

- - 3 4 - - - 8 - -

LXX; grade 55; tungsten 18, chromium 4, vanadium 1; for lathe centers for severe service. Ludlum Steel Co., Watervliet, N. Y.

Additions to listings:

6

LOTUS BABBITT; a lead base babbitt for bearings. Lumen Bearing Co., Buffalo.

6

LUBRICO; for bearings, bushings and bars; copper 75, lead 20 and tin 5 per cent. Buckeye Brass & Mfg. Co., Cleveland.

1 - - 4 5 6 7 8 - 10

LUMEN; Bronze, a zinc base alloy for bearings. Alloy No. 00A; high tin bronze for high compression bearing application. No. 00C; high tin bronze for high compression bearing application. No. 1; zinc bronze possessing high ductility for machine parts, pressure castings, etc. No. 2; zinc bronze for machine parts, bearings, etc. No. 3; corrosion resistant; zinc bronze, for mine service and paper mill machinery bearings. No. 4 and 4A; phosphor bronze (leaded) for bearings. No. 5; general service alloy; red brass; for pressure bodies, etc. No. 6; phosphor bronze (leaded) for bearings. No. 7; phosphor bronze; electrical uses, including trolley wheels, etc. No. 9; manganese bronze; possesses high tensile strength; for machine parts. No. 11-C; aluminum bronze; corrosion resistant, high tensile strength, heat treating; for miter and bevel gears, etc. No. 14; zinc bronze; babbitt backing; for valve bodies, etc. No. 15 and 15A; phosphor bronze; for worm wheels, bearings, etc. No. 20; super-manganese bronze; high tensile strength; for machine parts. No. 27; aluminum bronze; high tensile strength, heat treating, corrosion resistant; for strength parts. No. 31 and 33; high lead bronze for bearings. No. 48; nickel phosphor bronze, for bearings, worm wheels, etc. No. 54; phosphor bronze (leaded), for bearings. Produced by Lumen Bearing Co., Buffalo.

M

- - 4 5 - - -

MACALLOY; carbon .35, nickel .90, chromium .50, molybdenum .10 per cent; for parts requiring high strength and toughness. Colonial Steel Co., Monaca, Pa.

- - 3 4 - - -

MACHEMPITE "Wearproof"; alloy cast, forged or rolled steel; for gears, pinions, locomotive guides, crossheads, track wheels, sprockets, brake drums, conveyor parts, spindles, coupling boxes, cams, etc. Mackintosh-Hempill Co., Pittsburgh.

6

MACHINEBRONZE; a zinc bronze for general bearing requirements; cored and solid bars. Lumen Bearing Co., Buffalo.

2

MACKENITE METAL; heat resistant; for retorts, annealing pots, cylinders

and lead pan castings. Duncan MacKenzie's Sons Co., Trenton, N. J.

3

MAL-ARC; a hard surfacing material marketed in the form of an electrode. For application to machine parts, where abrasion is encountered. P. R. Mallory & Co. Inc., Indianapolis.

7

MANGANIN; copper, nickel and manganese alloy; for electrical uses including shunts, wheatstone bridges, and other precision instruments; possesses moderate resistivity, low temperature coefficient, low thermal E. M. F. against copper. Gilby Wire Co., Newark, N. J.

8 - 10

MANGANO; carbon 0.95, manganese 1.60, chromium 0.20; used where non-shrinking, oil quenching steel is required. Latrobe Electric Steel Co., Latrobe, Pa.

3

MARTIN STEEL; air hardening tool steel castings; chromium 12 to 14, cobalt .7 to .9, and carbon 1.5 to 1.6 per cent. Detroit Alloy Steel Co., Detroit.

3 4

MASSILLON; worm alloy; alloy cast steel, heat treated to give maximum wear and abrasive qualities; for domestic, industrial and locomotive stoker worms; SAE 9260; chrome-molybdenum, for coal mining machinery, and coal cutting links. Massillon Steel Casting Co., Massillon, O.

4 5

MAX-EL; machinery steels used where strength and toughness combined with ease of machining is desired; several grades, plain and alloy, varying in carbon from .10 to .80 to suit requirements. Crucible Steel Co. of America, New York.

4 5

MAYARI "A"; a chrome nickel steel;

for bolts, auto parts, axles, tools, etc. Bethlehem Steel Co., Bethlehem, Pa.

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MEEHANITE; a sorbo-pearlitic iron containing silicon, manganese, phosphorus, sulphur and carbon, the analysis depending upon the mixture which in turn depends upon the application; resistant to temperature, corrosion and wear; has high tensile strength; for rolls, wear plates, gears, pump cylinders, etc. Cast by licensed foundries in all important industrial centers in the country.

2

MICHIANA; Type 25-12; 18-8; 30-8; No. 48. Alloys of varying analysis for conditions of temperature and corrosion. Michigan Products Corp., Michigan City, Ind.

1 2

MIDVALOY; stainless steel A; chromium 9 to 16, carbon over .12B; chromium over 16, carbon over .12. Stainless steel 7; castings only; chromium 20, carbon .25, copper 1. Stainless iron C1; chromium 15 max., carbon .12 or under. C2; chromium 15 to 18, carbon .12 or under. C3; chromium 18 to 23, carbon .12 or under. C4; chromium 23 to 30. Cromaloy; chromium over 21, carbon low, silicon 1.5 to 3. All of the above alloys are primarily corrosion resistant. Grade HC; heat resistant; chromium 27, nickel 2 max., carbon as required. HR1; chromium 20, nickel 7, carbon .35, tungsten 4. Grade 18-8; corrosion resistant, chromium 18, nickel 8, carbon .06 up. Grade 25-10; corrosion resistant; chromium 25, nickel 10, carbon low. Grade B; heat resistant; chromium 23, nickel 11, carbon 1. Grade 25-20; corrosion resisting; chromium 25, nickel 20, carbon low, molybdenum .2. Aero Valve; heat, corrosion resistant; chromium 14, nickel 20, carbon .60, tungsten 2. Grade HY-X; heat, corrosion resistant; chromium 8, nickel 22, carbon low, copper 1. Grade ATV-3; heat and corrosion resistant; chromium 14, nickel 26, carbon .45, tungsten 3.5. Grade 30-30; chromium 30, nickel 30, carbon low, heat resisting. Grade A;

heat resisting; chromium 19, nickel 35, carbon low. Grade ATV-1; heat and corrosion resisting; chromium 11, nickel 36, carbon .35. Grade BTG; heat resisting; chromium 11, nickel 60, carbon .30, tungsten 2.5. Grade AMF; corrosion resisting. Grade 976; heat and corrosion resistant; for auto and diesel engine valves. Also KA2, KA2S, KA2Mo, KNG-3, castings only. Applications for the entire line include machines in the chemical and refining industries, mining and metallurgical work, rolls for paper machinery, impellers for exhaust gases, mechanical stoker parts, hydraulic machinery parts, etc. Midvale Co., Nicetown, Philadelphia.

6

MILL BRASS MIX; bearings, bushings and mill brasses. E. A. Williams & Son Inc., Jersey City, N. J.

4

5

MIRACULLOY; strength and ductility combined; chromium, nickel, manganese and molybdenum castings. Sivyer Steel Castings Co., Milwaukee.

1 2 - 4 5 - - 8 -

MISCO; Metal; nickel 35 to 37, carbon .50 to .70, chromium 15 to 17; high load carrying capacity up to 1950 degrees Fahr.; resistant to sulphuric acid; furnace parts, carburizing boxes, pots, retorts. Grade 18-8, chromium 18 to 20, nickel 8 to 10, carbon to suit; for valve and pump parts. Grade B; chromium 24 to 26, nickel 12 to 14, carbon .20 to .30; for furnace parts in sulphurous atmosphere. Grade B-1; chromium 24 to 26, nickel 12 to 14, carbon .40 to .60; for furnace parts in sulphurous atmosphere. Grade C; chromium 28 to 30, nickel 8 to 10, carbon .20 to .30; for valve fittings and pump parts for sulphite service. Grade C1; chromium 28 to 30, nickel 8 to 10, carbon .40 to .60; for high-heat furnaces where sulphurous compounds are present. Grade N; chromium 8 to 10, nickel 20 to 22, carbon .30 to .50; for valve and pump parts for alkali and sea water; heat resistant up to 1500 degrees Fahr. Grade HN; nickel 60

to 65, chromium 15 to 18, carbon .60 to .80; for retorts, lead baths, etc. Grade N-5; nickel 30, silicon 3 to 5, carbon .30 to .50; resistant to sulphuric acid. Cast and rolled. Michigan Steel Casting Co., Detroit.

1 2 3 4 - - - -

MISCROME; grade 1; chrome 16 to 17, carbon .20 to .30; for pump and valve parts; nitric acid resistant and heat resistant up to 1400 degrees Fahr. as in hot oil handling equipment. Grade 2; chromium 18 to 23, carbon .20 to .30; possesses high tensile strength; for pump and valve parts, etc; nitric acid resistant and heat resistant up to 1600 degrees Fahr. Grade 3; 26 to 30 chromium, .20 to .30 carbon; for severe nitric acid conditions; heat resistant up to 2200 degrees Fahr.; ore roaster parts, furnace rails and parts subject to low stress at high temperature (1800 to 2200 degrees Fahr.). Grade CR; 14 to 17 per cent chromium, 2 to 3 carbon; heat and abrasion resistant (mild cases); heat resistance up to 1400 degrees Fahr. Grade KR; chromium 26 to 30 per cent, carbon 2.0 to 3.0; abrasion resistant. Cast and rolled. Michigan Steel Casting Co., Detroit.

3

MOLYBDENITE; special chrome molybdenum steel casting for mill pinions, guides and rolls. Continental Roll & Steel Foundry Co., East Chicago, Ind.

1 2 3 4 5 - - - - 10

MO-LYB-DEN-UM; an alloying element for use in steel and iron; imparts strength, toughness, ductility and resistance to abrasion; improves fatigue value, increases physical properties at elevated temperatures; easily welded and an aid to machinability. Climax Molybdenum Co., New York.

4 5 - - 8 -

MO-LYB-DIE; Type 1; carbon .31, manganese .55, chromium .75.

nickel 1.50, molybdenum .25, silicon .20, phosphorus and sulphur .04 max. Type 2; carbon .40, manganese .55, chromium .75, nickel 1.50, molybdenum .25, silicon .20, phosphorus and sulphur .04 max. Type 3; carbon .55, manganese .55, chromium .75, nickel 1.50, molybdenum .30, silicon .20, phosphorus and sulphur .04 max. Applications include machine parts subject to extreme torsional strains, shock, vibration. A. Finkl & Sons Co., Chicago.

1 - 3 4 5 - - -

MONEL METAL; nickel 68, copper 29, balance iron, manganese silicon, carbon, general purpose alloy for use under corrosive conditions. International Nickel Co. Inc., New York, and licensees.

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MORAINE; bearings and bushings, rolled brass split type; for automobiles and electric motors. Moraine Products Co., Dayton, O.

1 - 3 4 - 6 - - -

MUELLER 600 BRONZE; forgeable bearing metal; to resist abrasion and for bearing applications; copper 60 per cent, zinc 35 per cent, other metals 5 per cent; for worm gears, driven gears, connecting rods, seal rings for refrigerators, crankshafts for oil pumps, etc. Mueller Brass Co., Port Huron, Mich.

Additions to listings:

N

1 2 3 - - - - -
NA, NA-1, NA-2; alloy steel, resistant to heat, corrosion and abrasion, in varying percentages of nickel and chromium. National Alloy Steel Co., Blawnox, Pa.

1 - - - - - 9 -

NATIONAL; corrosion resistant light weight alloys; aluminum alloyed with various hardeners to meet special casting requirements. National Smelting Works, Cleveland.

1 2 3 4 5 6 - 8 -

NEVASTAIN; CA grade 81; corrosion, abrasion, heat resistant, high tensile strength and ductility, suitable for bearing application; carbon .35, chromium 13; for pump shafts and machine parts. CB grade 82; similar properties; carbon .70, chromium 17; for pump shafts, oil machinery, etc. CC grade 523; corrosion, heat, abrasion resistant, high tensile strength; chromium 12, copper 1, low carbon; for pump shafts and plungers for hot and cold liquids. Especially suited for noncorrosive springs exposed to elevated temperatures. H grade 84; corrosion, heat, abrasion resistant, high tensile strength and bearing application; carbon 1, chromium 17, silicon 1; for pump shafts and other machine parts. S grade 85; corrosion, heat abrasion resistant, and possesses high tensile strength and ductility; carbon .12, chromium 14. RA grade 521; corrosion, heat, abrasion resistant, high tensile strength and ductility; chromium 16, copper 1, low carbon; for valves, spindles, etc. Ludlum Steel Co., Watervliet, N. Y.

1 - - - - -

NIAGARA: a line of alloying elements comprising some three hundred and fifty combinations applicable for deoxidizing and fluxing all types of metals intended for casting, and at the same time provid-

ing greater resistance to corrosion and higher pressure qualities such as are encountered in pumps and valves. Produced by the Niagara Falls Smelting & Refining Corp., Buffalo.

1 2 3 4 5 - 7 8 - -

NICHROME; principally heat resistant but also corrosion and abrasion resistant; nickel 62, chromium 15; heating element material for electrical heating devices, irons rheostats, potentiometers, etc. Type B; for addition to cast iron; sold in ratios of 5, 3, 2 parts of nickel to 1 part of chromium; improves quality and physical properties of cast iron when added to ladle. Grade S (sheet); nickel 27, chromium 15; welded tubing, etc. Type V; principally heat resistant but also possessing resistance to corrosion, high tensile strength, high ductility; heating element material for electric ranges, industrial furnaces, etc. V; sheet of similar analysis; used for welded tubing, etc. Cast Nichrome; principally corrosion resistant, for furnace parts, pyrometer protection tubes, glass rolls, conveyor chains, diesel engine valves, etc. Sheet Nichrome; same properties; nickel 60, chromium 15; for welded tubing, etc. Produced by the Driver-Harris Co., Harrison, N. J.

iron; for surveying instruments, bimetallic strip, astronomical instruments, thermostatic controllers for electric ovens, gas ovens, etc.; also for sealing in glass and for sealing through quartz for X-ray tubes. Driver-Harris Co., Harrison, N. J.

1 2 - - - -

NI-RESIST; cast iron; nickel 14, copper 6 and chromium 2 per cent; for castings handling corrosive waters and other solutions, or heats above the range of temperature where ordinary cast iron gives good service. International Nickel Co. Inc., New York, and licensees in various industrial centers.

- - - 4 - 6 - - -

NI-TENSYLIRON; nickel 1 to 4, total carbon 2.50 to 3.15, silicon 1.20 to 2.75, manganese .5 to .9 per cent; for machine tool castings, diesel engine housings, automobile cylinder blocks and pistons, etc. International Nickel Co. Inc., New York, and licensees.

1 - 3 4 5 6 - 8 - -

NITRALLOY; a chromium-molybdenum-aluminum steel capable of developing extreme hardness through nitriding. Republic Steel Corp., Youngstown, O., Crucible Steel Co. of America, New York. Colonial Steel Co., Monaca, Pa., Ludlum Steel Co., Watervliet, N. Y.

- 2 3 - - - -

NOGROTH; resistant to heat and abrasion; castings of alloy iron, nickel and chrome. The Q & C Co., New York.

1 - - - -

NONCORRODITE; chromium steel castings. Millbury Steel Foundry Co., Millbury, Mass.

1 - - - -

NON-SULITE; corrosion resisting al-

1 3 - - - -

NICRAL; a complete series of light aluminum alloys in various forms and tempers. Nieralumin Co., Jackson, Mich.

NI-HARD; cast iron; nickel 4 1/2, chromium 1 1/2, total carbon 2.7 to 3.6 per cent; for chilled rolls, cement grinding balls, etc. where abrasion is encountered. International Nickel Co. Inc., New York, and licensees.

1 10 - - - -

NILVAR; low expansion is principal characteristic; nickel 36, balance

loy. Michiana Products Corp., Michigan City, Ind.

Additions to listings:

machine parts because of its high tensile strength and toughness; abrasion resisting also. Cyclops Steel Co., Titusville, Pa.

Additions to listings:

O

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OHIO AIR DIE; carbon 1.60, chromium 12.00 per cent; for parts to resist excessive wear. Colonial Steel Co., Monaca, Pa.

- - - 6 - - - -

OILITE; oilless bronze bearings made from powdered virgin copper, tin and graphite by the sintering method; used extensively in automotive and other industries. Amplex Mfg. Co., division of Chrysler Corp., Detroit.

1 - - 3 4 5 - - -

OLYMPIC BRONZE; primary property is high tensile strength; copper 96.25, silicon 2.75, zinc 1 per cent; for strong rail and singeing uses where high strength and corrosion resistance are determining factors; used widely for tanks, bolts, screws, springs, etc. Chase Brass & Copper Co. Inc., Waterbury, Conn.

- - 3 4 5 - - - -

ORION; chrome vanadium steel for

P

1 - - - - -
PLYKROME; stainless clad steel embodying a special metallic bond sheet between the veneer of USS stabilized 18-8 and a mild steel backing; for machines employed in the dairy, brewery, canning, chemical and other industries. Illinois Steel Co., Chicago.

- - - 3 4 - - - -
POMPTON; 10-10 $\frac{1}{2}$ temper, grade 21; 1 to 1.05 carbon steel; for arbors, bushings, collets and lathe centers. Ludlum Steel Co., Watervliet, N. Y.

- - 2 3 4 - 6 - - -
PROFERALL; electric furnace high test cast iron, low carbon; chrome-nickel molybdenum alloyed; for crankshafts and camshaft castings, high strength heat resisting castings, hydraulic press and pressure castings, dies, etc. Campbell, Wyant & Cannon Foundry Co., Muskegon Heights, Mich.

1 2 - 4 - - 7 8 - -
PYRASTEEL; castings of various analyses; nickel varies from 4 per cent up, chrome from 8 to 26 per cent; for heat treating furnaces, screw conveyors, or any high temperature service up to 2200 degrees Fahr. Chicago Steel Foundry Co., Chicago.

2

PYROCAST; a nickel-chrome iron resistant to high temperatures. Pacific Foundry Co., San Francisco, Calif.

3 4 - - - 8 - -

PYTHON; grade 23; chromium .25, vanadium .25; for chuck jaws, clutch pins and other parts requiring unusual wear and shock resistance. Ludlum Steel Co., Watervliet, N. Y.

*Additions to listings:***Q**

1 2 3 - - -

Q-ALLOY; grade A+; heat resistant; 66 to 68 nickel, 19 to 21 chromium, balance mainly iron; for parts operating in temperatures up to 2200 degrees Fahr., such as continuous furnace mechanisms, conveyors, chains, etc. Chrome CN1; corrosion, heat resistant; 24 to 26 chrome, 11 to 13 nickel, balance iron and small percentage of special alloying elements when required; for general resistance to weathering and corrosive attack of most common acids; also fairly good resistance to high temperatures. Chrome CN2; 18 to 20 chrome, 8 to 10 nickel, balance mainly iron and special alloying elements when required; general resistance to weathering and corrosive attack of most common acids. Chrome C1; corrosion, heat resistant; 26 to 30 chromium with or without low nickel content; for parts in contact with mine water and certain other special acids; fair resistance to high temperatures. Chrome C2; 16 to 18 chromium; for parts in contact with nitric acid, etc.

Chrome C3; abrasion resistant; over 30 per cent chrome, carbon 2 to 3; ordinarily machinable only by grinding. General Alloys Co., Boston.

*Additions to listings:***R**

3

RCF; a chrome nickel alloy possessing wear resisting qualities. George H. Smith Steel Casting Co., Milwaukee.

- - 3 4 - - -

RED ANCHOR; carbon 1.05; drill rod ground ready for use for shafts, pins, etc.; drawn squares for keys and special drawn shapes to avoid excessive machining. Anchor Drawn Steel Co., Latrobe, Pa.

10

RESILIA; a special analysis silicon-manganese spring steel. Bethlehem Steel Co., Bethlehem, Pa.

- - 3 4 - - -

RESISTO-LOY; a hard-surfacing alloy with chromium 4, nickel 3.2, cobalt 11, tungsten 17, copper 59.19, lead .01, iron 2, arsenic-sulphur .08, silicon .01 phosphorus .03, manganese 1.5 per cent; for application by electric arc or oxyacetylene to shovel teeth, third rail shoes, agricultural machinery parts, etc. Resisto-Loy Co., Grand Rapids, Mich.

1 2 3 4 5 - - -

RITA; chrome nickel steels for high strength, wearing qualities and toughness; resistant to corrosion and heat.

Cannon-Stein Steel Corp., Syracuse,
N. Y.

1 - 3 4 5 6 7 8 - -

RIVERSIDE; beryllium copper, a heat treatable copper alloy; for electrical applications, springs, diaphragms, jet tips, valve sleeves and seats, etc.; properties include high resistance to corrosion and abrasion, high tensile strength and ductility. Phosphor bronze; copper tin alloy to which phosphorus has been added; resistant to corrosion, and wear, has high strength and ductility; used in electrical appliances and machinery as bearings, springs, diaphragms, textile ring travelers, etc. Nickel silver; copper, nickel, zinc in varying proportions; for diaphragms, radio and telephone springs, screw machine products, etc. Riverside Metal Co., Riverside, N. J.

1 - - 4 5 6 - - -

ROMAN BRONZE; copper 60, tin .75, zinc 39.25; high strength and ductility, corrosion resistant; for forging, flanging, upsetting, piston rods, shafting and other machine parts. Revere Copper & Bronze Inc., New York.

1 - - 4 - - - 9 -

RUSELITE; chromium 1 $\frac{1}{4}$ to 1 $\frac{1}{2}$ per cent, molybdenum .10 per cent, copper 3 $\frac{1}{2}$, balance aluminum; for die castings and sand castings that ordinarily would be chromium plated. Ruselite Corp., Milwaukee.

Additions to listings:

S

6 - - -

SABECO; bearing bronze; No. 5; copper 69 to 71, tin 4.5 to 5.5, lead 24 to 26, max. impurities .25 per cent. No. 9; copper 69 to 71, tin 8.5 to 9.5, lead 20 to 22, max. impurities .25. No. 11; copper 69 to 71, tin 10.50 to 11.50, lead 18 to 20, max. impurities .25 per cent; for spindle bearings, water lubricated bearings, seal noses on bellows seals. Fredericksen Co., Saginaw, Mich.

6 - - -

SATCO; white metal bearing alloy; high melting point; nondeforming; suitable for die casting; primary application is bearing liners. National Lead Co., New York.

3 4 5 - - 8 - -

SEMINOLE; grade 42; chromium 1.30, tungsten 2, vanadium .25; for high creep strength bolts and studs for super heated steam; also machine parts having high wear and fatigue values. Ludlum Steel Co., Watervliet, N. Y.

1 - - -

SEYMOREITE; copper 64, nickel 18 and zinc 18 per cent. Seymour Mfg. Co., Seymour, Conn.

1 2 3 - - -

SHAWINIGAN NIROSTA; chrome nickel steels, for applications where heat and corrosion are encountered. Shawinigan Chemicals Ltd., Montreal, Que.

4 5 - - -

SIMPLEX; forging steel; nickel 1.25, chromium .75; used for machine parts where high strength and toughness are required; also available in case carburizing type. Crucible Steel Co., of America, New York.

7 - - 10

SMITHCO DYNAMO; an alloy steel possessing high magnetic permeability. George H. Smith Steel Casting Co., Milwaukee.

1 2 3 - - - -

STAINLESS; "A"; for wearing parts requiring a stainless steel; carbon .30, chromium 13.50 per cent. "B"; also corrosion, abrasion resistant; carbon .65, chromium 16.50. "F.M.S.": carbon .12 max., chromium 13.50; for machined parts where a corrosion, heat resistant material is required. "N": carbon .12 max., chromium 18, nickel 8.50; for parts requiring high resistance to corrosion, 410 and 410F; carbon .12 max., chromium 13.50; nickel .80; for corrosion resistance. Vanadium Alloy Steel Co., Latrobe, Pa., and Colonial Steel Co., Monaca, Pa., are producers.

- 2 - - - -

STANDARD-ALLOY: a chromium-nickel alloy; 20 to 60 nickel, 16 to 25 per cent chromium for heat resisting castings. Standard Alloy Co., Cleveland.

- 6 - - - -

STANNUM BABBITT; tin base babbitt for bearings. Lumen Bearing Co., Buffalo.

1 2 3 4 5 - - - - 10

STERLING; type A; carbon over .12, chromium 12 to 15; maximum resistance to corrosion secured by hardening. Type B; harder than type A. Type BHH; extra hard, carbon 1.05, chromium 17, for ball races, valve parts, bearing surfaces. T; high tensile strength; when treated possesses balance between strength, toughness, machinability and corrosion resistance, for valves, pump rods, pistons, etc. TX; for turbine blading. FC; for applications where free cutting properties are required. M; soft ductile steel, requires no heat treatment to secure corrosion resistance. MG; used where strength and toughness are secondary to workability and high temperature resistance. Nirosta KA2; for oil and chemical industries, in hard wire makes excellent springs. Nirosta KA2S; malleable for hot and cold working. Nirosta FC; free machining 18-8 type in which machinability has been obtained without sacrificing corrosion resist-

ance, strength, toughness. Firth-Sterling Steel Co., McKeesport, Pa., is the producer.

- 6 - - - -

SUMET; bronze bearing metals; SM-4; lead 28 per cent, for light and medium duty at high speed. SM-8; lead 26; for moderately severe service. SM-10; lead 24; for bearings subject to shock and impact. SM-12; lead 22; for slow speed under heavy load and impact. SM-14; lead 14; for severe service subjected to heavy shock. SM-16; lead 20; for heavy duty slow speed service. SM-18; lead 17½; for extremely severe service; uses include roll neck bearings; also suitable for gear blanks. Produced by Sumet Corp., Buffalo.

- 3 4 5 - - - -

SUPERLOY; No. 4; chrome molybdenum steel for gears, pistons, and heavy duty service where exceptionally high strength and resistance to wear is required. No. 7; 12 per cent manganese steel and 1.25 carbon; for liner plates for ball and rod mills, mantles for gyratory crushers, hammers for hammer mills, jaw plates, roll shells, dipper teeth, tractor shoes, chain, pumps, conveyors, gears, sheaves, etc. Washington Iron Works, Seattle, Wash.

- 2 - 4 - - - -

SUPERTEMP; an alloy steel having tensile strength at high temperature; suitable for bolts and studs for reactivation chambers, cracking stills, superheaters, etc. Bethlehem Steel Co., Bethlehem, Pa.

1 2 3 4 5 - - - -

SWEETALOY; No. 16, 18 per cent chromium iron. No. 17; 18 per cent chromium and 8 per cent nickel. No. 18; 22 nickel and 10 per cent chromium. No. 19; 28 per cent chromium. No. 20; 36 per cent nickel and 18 chromium. No. 21; 65 nickel and 15 chromium. No. 22; 28 chromium and 10 per cent nickel; for castings for chemical plants, paper mills, oil refineries, textile, food product indus-

tries, etc. Cooper Alloy Foundry Co., Elizabeth, N. J.

Additions to listings:

piston rods. American Brass Co., Waterbury, Conn.

- 2 3 - - - -

TEMP ALLOY; chrome alloy heat resisting cast iron used for furnaces and other designs subject to high temperatures and abrasion. Continental Roll & Steel Foundry Co., East Chicago, Ind.

- - 3 4 - - - 8 -

TETON; grade 32; carbon 1, chromium 1.40; for balls and ball races, bushings, cams, etc. Ludlum Steel Co., Watervliet, N. Y.

1 2 - - - - 10

THERMALLOY; Grade A; oxidation resistance combined with good strength, 55 to 65 nickel, 15 to 20 chromium; for retorts, cyanide pots. Grade B; maximum operating temperature 2050 degrees Fahr.; 35 to 40 nickel, 15 to 18 chromium; for rollers, chain, skid rails, disks. Grade C; 20 to 30 chromium, nickel under 2 per cent; used in chemical industry, for rabble arms and blades on furnaces where easily machinable chromium iron is necessary; with nickel up to 12 for pump parts, valves, rolling mill guides, etc. Rustless irons; low carbon straight chromium iron and 18-8 for corrosion and chemical resistance principally. Electro-Alloys Co., Elyria, O.

- - 3 - 5 - - -

TIGERLOY; nickel-molybdenum; for shovel castings, gears, crane track wheels, castings for impact resistance. Massillon Steel Casting Co., Massillon, O.

- 2 3 - - - -

TIMANG; nickel manganese steel; can be rolled, drawn, forged or shaped; for journal box liners, pedestal gib liners, conveyor flights, welding rod, etc. Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

- 2 - 4 - - - -

TIMKEN 17-22 STEEL; exceptionally

T

1 - - - -
TAM ALLOYS; a line of ferrous alloys including ferro carbon-titanium; 7.5 per cent carbon. Standard low carbon ferro-titanium; .2 per cent carbon, etc. for rolled, cast and forged steels, stainless and alloy steels and cast iron. Also alloys of varying analyses for special purposes. Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

1 - 3 - - - -

TANTIRON; 84.9 per cent iron, 13.5 silicon, .8 to 1 carbon, .4 manganese, .18 phosphorus and .05 sulphur; castings for vessels, liners, inserts, chutes, troughs, feed pipes, etc. Bethlehem Foundry & Machine Co., Bethlehem, Pa.

1 - 3 4 - - - 8 -

TEMPALOY; B; copper 91.2, aluminum 4, silicon .8 nickel 4. Grade C; copper 87.1, iron .25, manganese .50, aluminum 6.75, silicon .90, nickel 4.50. Principal application of these alloys is those instances where a heat treatable alloy is required for strength and resistance to corrosion. Particular uses include motorboat shafting and

high tensile strength and good resistance to creep up to 1200 degrees Fahr.; carbon .40 to .50, manganese .30 to .60, silicon .50 to 1, chrome 1.10 to 1.40, tungsten .80 to 1, vanadium .25 to .35; suitable for highly stressed bolts, studs, screws in high temperature service. The steel can be air treated to meet the mechanical properties. Timken Steel & Tube Co., Canton, O.

T
TISCO; corrosion resistant stainless steel castings of all compositions. Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

T
TONCAN; an iron alloyed with copper and molybdenum; corrosion resistant. Republic Steel Corp., Youngstown, O.

T **2** - - - **7** - - -
TOPHET; type A; intended primarily for electrical uses; heat and corrosion resistant, containing approximately 80 per cent nickel and 20 chromium; for electrical heating applications. Type C; also for electrical uses and is heat resistant, being made up of nickel, chromium and iron; for electrical resistance and heating applications. Gilby Wire Co., Newark, N. J.

T **3** **4** - - -
TUFALOY; an alloy cast steel possessing a high yield point and wear resisting qualities. Fort Pitt Steel Casting Co., McKeesport, Pa.

T **1** - **3** **4** - - -
TUF-STUF; copper 87 per cent, iron 3 and aluminum 10 per cent; for application where high tensile strength, resistance to abrasion and to sulphuric acid is required. Mueller Brass Co., Port Huron, Mich.

Additions to listings:

U

1 **2** - - -
UNILOY; No. 1; noncorrosive, heat resisting up to 1600 degrees Fahr.; chromium 18, nickel 8 per cent. No. 2; noncorrosive, heat resisting to 1800 degrees Fahr.; chromium 21, nickel 12. No. 1409; noncorrosive stainless iron; chromium 12 to 14, carbon .1 per cent. No. 1809; noncorrosive high chrome stainless iron; chromium 16 to 18, carbon .1 per cent. No. 2825; noncorrosive iron; heat resisting to 2000 degrees Fahr.; chromium 28 per cent. Cyclops Steel Co., Titusville, Pa.

3 **4** **5** - - -
UNIVAN; nickel vanadium alloy, the primary property of which is high ductility; for locomotive frames, crossheads, coupling boxes, driving wheel centers, etc. Union Steel Casting Co., Pittsburgh.

1 **2** - - -
USS; stainless and heat resisting steels. Type 4/6 CR; carbon .15, manganese .60, phosphorus .03, sulphur .03, silicon .50, chromium 4 to 6. Type 4/6 CR-MO; carbon .15, manganese .60, phosphorus .03, sulphur .03, silicon .50, chromium 4 to 6, molybdenum .40 to .65. The two above types can be furnished in .10, .20, and .25 carbon. Type 4/6 CR-T; carbon .15, manganese .60, phosphorus .03, sulphur .03, silicon .50, chromium 4 to 6, titanium is 5 times the minimum carbon content. USS 12, carbon .10, manganese .50, phosphorus .03, sul-

phur .03, silicon .50, chromium 11.50 to 14. No. 17; carbon .10, manganese .50, phosphorus .03, sulphur .03, silicon .50, chromium 16 to 19. No. 21; carbon .10, manganese .50, phosphorus .03, sulphur .03, silicon .50, chromium 20 to 24. No. 27, carbon .10, manganese .50, phosphorus .03, sulphur .03, silicon .50, chromium 25 to 30. 18-8; carbon .15, manganese .50, phosphorus .03, sulphur .03, silicon .75, chromium 17 to 20, nickel 8 to 12. 18-8S; carbon .07, manganese .50, phosphorus .03, sulphur .03, silicon .75, chromium 17 to 20, nickel 8 to 12. Stabilized 18-8; carbon .12, titanium 5 times the minimum carbon content, remaining analysis similar to 18-8S; developed to provide a steel in which intergranular corrosion adjacent to welds is prevented. 19-9; carbon .20, manganese .50, phosphorus .03, sulphur .03, silicon .75, chromium 18 min., nickel 8 min. 20-10; carbon .20, manganese .50, phosphorus .03, sulphur .03, silicon .75, chromium 19 min., nickel 9 min. 25-12; carbon .25, manganese 2.00, phosphorus .03, sulphur .03, silicon .75, chromium 22 to 28, nickel 12 to 16. United States Steel Corp. subsidiaries, including American Sheet & Tin Plate Co., American Steel & Wire Co., Carnegie Steel Co., Illinois Steel Co., National Tube Co.

Additions to listings:

1 - 3 - - - -
VANCORAM; ferro-alloys of vanadium, silicon, chromium and titanium; silicon-manganese, tungsten and molybdenum; resistant to corrosion and wear; for a wide variety of applications as machine parts. Vanadium Corp. of America, New York.

- - 4 5 - - - -
VASCO VANADIUM; carbon from .45 to .95, chromium .90, vanadium .18; for parts requiring high strength and toughness. Vanadium-Alloy Steel Co., Latrobe, Pa.

Additions to listings:

W

- - 3 - - - - 8 - 10
WANDO; oil hardening steel; carbon .95, manganese 1.05, chromium .50 per cent; nondeforming, hardens uniformly; has abrasion resisting properties. Cyclops Steel Co., Titusville, Pa.

Additions to listings:

V

6 - - - -

VANADIUM BB; carbon 1.00, chromium 1.40, vanadium .20 per cent; for bearings and races. Vanadium-Alloy Steel Co., Latrobe, Pa.

X

2 - - - -

X-ITE; 37 to 39 nickel, 17 to 19 chromium; for furnace parts where not subjected to alternate heating and cool-

ing cycles; standard material for commercial heat treating furnace parts. General Alloys Co., Boston.

Additions to listings:

.04 balance zinc. No. 5; aluminum 4.10, copper 1.00, magnesium .03, balance zinc. These alloys are employed for a wide range of machine parts in the form of die castings. New Jersey Zinc Co. Inc., New York.

- 2 -

ZORITE; nickel 35, iron 17, chromium 15, manganese 1.75, and carbon 0.5 per cent; resistant to high temperatures. Michiana Products Corp., Michigan City, Ind.

Y

Additions to listings:

1 - 3 4 5 - - -
Z-RON; heat treated white iron (spheroidized); for underground bolts, hydraulic castings, gears, chain, connecting rods, and other machine parts. Gunite Foundries Corp., Rockford, Ill.

Additions to listings:

Z

- 10 -

ZAMAK; die casting alloys; No. 2; aluminum 4.10, copper 2.70, magnesium .03, balance Horsehead zinc. No. 3; aluminum 4.10, magnesium

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